REMARKS/ARGUMENTS:

Reconsideration of the application as amended is requested.

The Examiner's remarks and cited references have been received and carefully considered. Claims 2-15, 17-23 and 25 are pending and at issue in the present application, claims 1 and 24 having already been canceled in the preliminary amendment of record in this application, and claim 16 is being canceled by this amendment. Originally presented claims 10, 15 and 18-22 have been amended.

With regard to the Examiner's objections to the drawings, the specification has been amended at pages 4 and 13 to delete reference to "Fig. 8A".

In response to the Examiner's objections to the specification, a reference to "52DD" has been added to the specification at page 18 to conform with Figs. 61-63. Further, pages 7 and 8 were noted as missing by the Examiner, and clean copies of these pages are submitted herewith, as originally filed and published in the corresponding PCT patent application from which priority is claimed. The brief description of Figs. 69-74 appears on page 7 of the specification submitted herewith.

Because claim 1 has been canceled, dependent claims 10 and 15 have been amended to depend from currently pending claim 25.

Pursuant to the Examiner's suggestion, claims 18-22 have been amended to indicate a singular "foot" instead of multiple "feet."

With respect to the Examiner's rejection of claim 21 under 35 U.S.C. § 112 (second paragraph), the term "composite" appears at page 3, line 26 and page 12, line 20 of the specification, and refers to insulative material for the feet, which may include "wire mesh, ceramic, a composite or similar structurally-rigid high temperature stable insulative material." Claim 21 has been amended to recite that the foot includes "a structurally-rigid high temperature stable insulative material", as clearly set forth at page 3 of the specification.

With reference to the Examiner's rejection to claim 23, claim 16 has been canceled to overcome the noted redundancy with respect to claim 23.

It is respectfully submitted that all pending claims should now be allowed, since the references, taken singly or in any combination, do not teach the invention set forth therein. A notice to this effect is earnestly solicited.

Respectfully submitted,

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CERTIFICATE OF MAILING

I hereby certify that this correspondence, and all identified enclosures and attachments are being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, Virginia 22313-1450, on 11/18/04.

Carl S. Clark

BRC/CSC/dcp/jkrp
Enclosures

Figs. 69 and 70 are cross-sectional views of the support ring in Fig. 68 taken along a plane that extends perpendicular to the longitudinal direction of the catalytic converter;

Fig. 71 is a side cross-sectional view of a modified catalytic converter having a modified spoke support system that facilitates manufacture;

Fig. 72 is an enlarged fragmentary view of a modified end construction similar to the end construction of the converter shown in Fig. 71;

Fig. 73 is an exploded view of Fig. 72; and

Fig. 74 is a schematic view of a particulate trap incorporating aspects of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The illustrated catalytic converter 20 (Fig. 1) is a vacuum-insulated converter having a core or inner housing 21 positioned within and insulated from a jacket or outer housing 22. Expansion joints 23 and 24 are provided at each end of the inner housing 21, and supports 25 and 25' are provided to support the inner housing 21 within the outer housing 22 while maintaining a vacuum-insulating cavity 26 forming a relatively constant gap around the inner housing 21. A sufficient vacuum is drawn on the cavity 26 so as to eliminate heat loss from air conduction and convection. The supports 25 and 25' within the converter design are particularly configured to accommodate longitudinal thermal expansion of the hot inner housing 23 relative to the cool outer housing 24. The internal supports 25 and 25' bridge the vacuum insulation and are sufficiently stiff to accommodate dynamic (vibration and impact) loads at temperature, yet are flexible enough to accommodate unequal thermal expansion of the inner and outer housings 21 and 22, and further are of minimal cross section size and minimal conductance to minimize heat loss.

More specifically, the inner housing 21 is preferably fabricated of metal or other material that is impermeable to gases, and is adapted to contain one or more catalyst substrates 27 and 27'. Exhaust gases from an internal combustion engine flow through the catalytic converter 20, as indicated by the arrows 28, including through the numerous small, catalyst-coated pores or channels that are formed in the catalytic substrates 27 and 27'. The inner housing 21 is enclosed within the outer housing 22, and its sidewall 30 is spaced radially inwardly from the sidewall 31 of the outer housing with the supports 25 and 25' supporting it to maintain a relatively constant gap. The

outer housing 22 is also preferably fabricated of metal or other material that is impermeable to gases, even in hot and high-order vacuum environments. The annular space or cavity 26 formed between the inner and outer housings 21 and 22 is evacuated to form a sufficient vacuum. The insulating performance of the cavity 26 is variably-controlled by a temperature-sensitive hydrogen-source device 32 that includes hydride material, and the vacuum is maintained by a vacuum maintenance device 32' that includes a getter material.

A funnel-shaped inner inlet end cone 33 is attached to the inlet end of the sidewall 30 of the inner housing 21, and a funnel-shaped outer inlet end cone 34 is attached to inlet end of the sidewall 31 of the outer housing 22. An inlet subassembly 35 includes an inlet tube section 36 attached to the open end of the outer inlet end cone 34, and an inlet tube section 37 attached to the open end of the inner inlet end cone 33. A bellows 38 is attached between the inboard and outboard inlet tube sections 36 and 37, the bellows 38 being configured to allow dissimilar longitudinal thermal expansion of the inner and outer housings 21 and 22. An end of the inlet tube section 36 projects from the outer inlet end cone 34, and an annular attachment flange 39 is secured to the inlet tube section 36 for attaching the catalytic converter 20 to an engine exhaust pipe. The illustrated supports 25 extend from the outer inlet end cone 34 to the inner inlet end cone 33 at a plurality of circumferentially-spaced positions. The supports 25 include spokes 40, a hub flange 41, and a rim flange 42, that abut and are joined to the inner and outer inlet end cones 33 and 34.

A funnel-shaped inner outlet end cone 43 is attached to or formed in the outlet end of the sidewall 30 of the inner housing 21, and a funnel-shaped outer outlet end cone 44 is attached to or formed in the outlet end of the sidewall 31 of the outer housing 22. An outlet subassembly 45 includes an outlet tube section 46 attached to the open end of the outer outlet end cone 44, and an outlet tube section 47 attached to the open end of the inner outlet end cone 43. A bellows 48 is attached between the inlet and outlet tube sections 46 and 47, the bellows 48 being configured to allow dissimilar longitudinal thermal expansion of the inner and outer housings 21 and 22. An end of the outlet tube section 46 projects from the outer outlet end cone 44. It includes a tube 49' shaped to form an annular space for holding getter and hydride material. An exhaust pipe attachment flange 49 is secured to the outlet tube section 46 for attaching the catalytic converter 20 to an engine exhaust pipe. The illustrated supports 25' extend from the